A Financial Analysis of Ohio Elevator Operations

By

JOHN W. SHARP and C. PHILLIP BAUMEL

Research Bulletin 813

JUNE 1958

OHIO AGRICULTURAL EXPERIMENT STATION

Wooster, Ohio

TABLE OF CONTENTS

FORWARD

Ross A. Milner, Grain & Farm Supply Extension Specialist consulted in the analysis of the data. A bulletin entitled "Lets Weight the Business, Too" No. AE280 under his authorship is a result of the cooperation in the use of these data.

INTRODUCTION

Country elevators perform a vital function in our agricultural marketing system. Modern technology and the demand for additional services by farmers has caused elevator management to become exceedingly complex.

The purpose of this study is to determine those factors that are common among successful firms. This information can be used by elevator managers as a guide to management decisions.

PROCEDURE

The data were obtained from a random selection of 100 country elevators in Ohio. Of this total, 76 per cent were cooperative, 21 per cent were independent, and 3 per cent were independent line elevators. Data were obtained from all types of elevator and operations throughout the state of Ohio. Net profit was calculated before federal taxes and patronage dividends so that the data from independent and cooperative elevators could be accurately compared.

The data were placed in frequency distributions of total sales and grain sales as a per cent of total sales. The purpose of these frequency distributions was to present the large volume of data in a compact form and to facilitate analysis.

This study assumes that profitability of a firm is the ultimate measure of success. There are several measures of profitability of a firm. Among these are: (1) net profit per dollar sale; (2) rate of return on owner investment; and (3) net income expressed in dollars.

Some writers suggest that net profit per dollar sale is the appropriate measure of success. Many managers evaluate their operations in terms of this goal. Net profit per dollar sale was chosen as the measure of success in this study because of the frequent use made of this goal in the trade and because it was believed that net profit per dollar sale would permit a valid measurement of the effect of independent variables on the success of an organization.

Simple and multiple regression analysis was used to determine the relationship

Table I

Statement of Income of 100 Elevator Operators
in Ohio Grouped According to Total Sales
Fiscal Year, 1956

Income (sales)	Total Sales Volume (Thousands of Dollars)									
	Under $175	$175 349	$350 524	$525 699	$700 874	$ 875 1,049	$1,050 1,224	$1,225 1,399	$1,400 1,574	$1,575 & Over
	Dollar Sales									
Supplies	$ 66,207	$ 91,685	$204,425	$222,661	$282,708	$250,709	$ 398,864	$ 453,362	$ 344,060	$ 854,393
Grain	60,638	167,505	233,578	380,981	495,391	717,183	757,039	858,701	1,084,352	867,815
Net Sales	$126,846	$259,190	$438,003	$603,642	$778,099	$967,892	$1,150,903	$1,312,063	$1,428,412	$1,722,208
Cost of Goods Sold	110,394	233,430	389,501	545,000	710,545	892,601	1,059,072	1,203,921	1,321,319	1,534,831
Gross Margins	$ 16,452	$ 25,760	$ 48,502	$ 58,642	$ 67,554	$ 75,291	$ 91,831	$ 108,142	$ 107,093	$ 187,377
Other Operating Income										
Grinding, Mixing, Cleaning	$ 3,944	$ 4,934	$ 9,887	$ 8,796	$ 8,174	$ 9,616	$ 7,820	$ 13,296	$ 14,784	$ 6,920
Trucking	2,896	1,130	2,558	3,899	3,861	5,697	11,267	5,155	7,052	-----
Recovery of Doubtful Accounts	-----	443	248	355	184	-----	648	489	14	-----
Storage	1,113	4,159	7,926	1,648	1,980	1,145	1,784	2,639	5,483	-----
Handling Gov't. Grain	2,019	322	2,039	5,278	2,158	1,337	2,495	3,979	-----	-----
Miscellaneous	318	590	1,589	1,359	2,421	765	3,578	295	8,651	-----
Total Other Operating Income	$ 5,689	$ 6,883	$ 14,898	$ 14,525	$ 14,012	$ 13,039	$ 19,163	$ 19,285	$ 24,981	$ 6,920
Total Operating Income	$ 22,141	$ 32,018	$ 62,848	$ 80,633	$ 80,633	$ 88,330	$ 110,995	$ 127,427	$ 132,074	$ 194,298

Table II

Statement of Expenses of 100 Elevator Operators
in Ohio Grouped According to Total Sales
Fiscal Year, 1956*

Income (sales)	Total Sales Volume (Thousands of Dollars)									
	Under $175	$175 349	$350 524	$525 699	$700 874	$ 875 1,049	$1,050 1,224	$1,225 1,399	$1,400 1,574	$1,575 & Over
Operating Expenses										
Salaries & Wages	$11,878	$14,089	$28,716	$32,951	$35,578	$40,644	$51,369	$55,568	$51,548	$ 82,795
Supplies, Repairs & Maintenance	762	1,621	2,618	3,222	2,978	2,381	4,046	3,753	4,544	7,177
Heat, Light, Water & Power	944	1,482	2,642	2,850	3,387	3,123	3,357	3,865	5,798	3,929
Depreciation	1,360	2,843	6,644	5,593	8,012	11,538	8,162	11,522	10,260	15,713
Insurance	904	1,241	2,120	2,557	3,105	3,002	3,162	3,906	3,958	7,872
Taxes	819	1,103	2,610	2,673	3,111	3,263	4,640	3,801	3,777	4,515
Telephone & Telegraph	250	206	475	358	633	449	672	735	799	1,039
Truck Expense	631	1,428	2,871	2,943	3,448	3,388	3,761	4,829	6,079	3,931
Bad Debt Expense	643	160	707	822	1,123	395	583	850	1,231	161
Rent	145	46	692	158	324	165	177	209	196	------
Discounts Allowed	------	28	3,306	3,291	3,100	1,332	14,073	------	1,678	------
Advertisement	257	442	900	791	1,422	952	1,269	1,027	1,793	------
Travel	133	603	576	334	592	564	32	722	626	------
Donation	7	11	108	64	45	149	25	159	130	------
Office Supplies	455	321	599	585	677	915	878	486	1,007	1,784
Dues & Subscriptions	53	62	202	207	271	394	381	------	118	------
Director Fees	107	227	331	366	335	328	692	818	484	1,320
Miscellaneous	446	680	1,175	1,390	1,706	873	1,131	2,043	6,581	2,144
Total Operating Expenses	$18,618	$25,742	$53,269	$58,030	$65,077	$71,969	$89,501	$93,089	$97,323	$132,380
Non-operating Expenses	$ 247	$ 478	$ 1,208	$ 718	$ 3,630	$ 2,025	$ 1,346	$ 660	$ 2,125	$ 3,356
Non-operating Income	936	601	3,639	3,322	5,004	3,691	10,842	16,481	5,134	4,597
Net Profit Before Federal Income Tax	4,022	6,582	11,650	17,979	17,564	18,702	31,259	50,378	38,823	63,159
Net Profit Per Dollar Sale	3.17%	2.54%	2.66%	2.98%	2.26%	1.93%	2.72%	3.84%	2.72%	3.67%

*The statements do not necessarily balance since each figure is an average of those elevators reporting that item.

Table III

Balance Sheets by Sales Groups*
100 Country Elevators, Ohio
End of Fiscal Year, 1956

Assets	Total Sales Volume (Thousands of Dollars)									
	Under $175	$175 349	$350 524	$525 699	$700 874	$ 875 1,049	$1,050 1,224	$1,225 1,399	$1,400 1,574	$1,575 & Over
	(Dollar Sales)									
Current Assets										
Cash	$9,925	$9,855	$9,417	$16,648	$15,967	$18,985	$23,246	$63,893	$44,615	$61,386
Customers Accounts Rec.	6,513	15,585	25,913	28,632	40,718	21,772	40,103	65,381	46,679	43,294
Allowance for Bad Debts	832	1,107	2,265	3,500	4,280	2,177	2,451	3,485	3,239	----
Trade Accounts	10,832	1,942	3,241	3,269	5,063	3,973	11,525	8,550	7,298	18,708
Notes Receivable	10,561	15,611	25,508	28,063	41,297	22,727	42,262	70,447	48,913	62,002
Inventories	11,029	13,475	36,520	35,759	51,241	36,464	58,262	45,295	54,789	71,338
Prepaid Items	359	411	978	1,159	1,326	1,535	1,287	5,552	1,527	6,667
Total Current Assets	$31,859	$39,277	$73,408	$81,630	$112,498	$79,712	$124,800	$185,188	$148,432	$195,392
Investments	$ 3,790	$ 3,000	$12,912	$16,130	$ 22,137	$17,667	$ 26,240	$ 63,311	$ 22,708	$ 1,087
Net Fixed Assets	$20,613	$32,404	$51,896	$64,362	$ 87,441	$96,861	$108,932	$133,351	$174,445	$369,182
Liabilities & Net Worth										
Current Liabilities	$ 3,881	$ 9,078	$25,551	$23,392	$ 52,622	$36,748	$ 36,843	$ 50,691	$ 96,308	$ 62,632
Deferred Liabilities	$ 4,213	$36,470	$32,982	$27,385	$ 39,113	$39,552	$ 56,535	$ 28,506	$ 85,093	$180,800
Net Worth										
Capital Stock Outstanding	$22,936	$31,595	$54,757	$58,840	$ 91,325	$63,572	$ 83,774	$148,792	$116,071	$204,300
Capital Surplus	4,047	691	964	4,204	357	1,554	2,454	----	2,500	----
Earned Surplus 1/	24,883	29,063	42,466	69,284	57,725	75,028	92,164	172,865	76,197	117,929
Total Net Worth	$49,553	$57,882	$91,737	$123,871	$143,034	$129,161	$177,901	$321,657	$186,868	$322,299

* The statements do not necessarily balance since each figure is an average of those elevators reporting that item.

1/ For cooperatives this would also include patronage withheld.

Table IV

Percentage Gross Margin of Various Commodities by Sales Groups of
100 Country Elevators, Ohio
Fiscal Year, 1956

Commodity	Total Sales Volume (Thousands of Dollars)									
	Under $175	$175 349	$350 524	$525 699	$700 874	$ 875 1,049	$1,050 1,224	$1,225 1,399	$1,400 1,574	$1,575 & Over
Grain										
Wheat	7	4	5	5	5	5	4	4	4	3
Corn	12	8	10	9	8	7	6	6	7	8
Soybeans	6	8	4	3	4	4	2	2	5	4
Oats	13	8	8	9	7	7	9	8	6	6
Total Grain	9	7	7	6	6	6	4	5	5	6
Supplies										
Feed	19	15	18	15	15	13	14	16	15	-
Fertilizer	7	11	12	11	9	8	12	12	9	11
Seed	17	15	14	17	13	13	11	17	14	12
Coal	19	24	19	19	15	20	17	17	24	20
Petroleum	16	-	14	11	15	13	15	16	8	17
Fence	14	16	13	11	14	13	16	5	9	-
Machinery & Parts	7	-	10	-	8	9	14	-	-	-
Hardware	-	-	26	18	-	22	-	-	-	-
Lumber	-	-	17	27	-	24	21	-	-	20
Miscellaneous	13	14	15	16	11	11	12	16	7	12
Total Supply	17	15	16	15	13	14	15	15	12	16
Total Gross Margins	13	10	12	10	9	8	9	8	8	11

between net profit per dollar sale and selected independent variables.

Tables I, II, and III contain summaries of the basic data used in this study. These tables present the balance sheets, statement of operations and gross margins for each commodity handled. The 100 elevators were grouped into 10 classifications according to sales volume. For example, the statement of operation listed under "Under $175,000" is the average of the elevators with a total sales volume of less than $175,000.

Elevator operators may use these tables as a source of comparison of their own operations. This can be accomplished by selecting the range of sales volume in which your elevator falls and comparing the data of the average operation with your own statements.

It should be noted that the statements presented may not balance because each figure is an average of the elevators reporting that figure. In addition, averages tend to eliminate the extremes in statistical data. For example, net profit per dollar sale ranged from - 2.48 to 7.00 per cent in this sample. However, these ranges will be brought out in the following discussion.

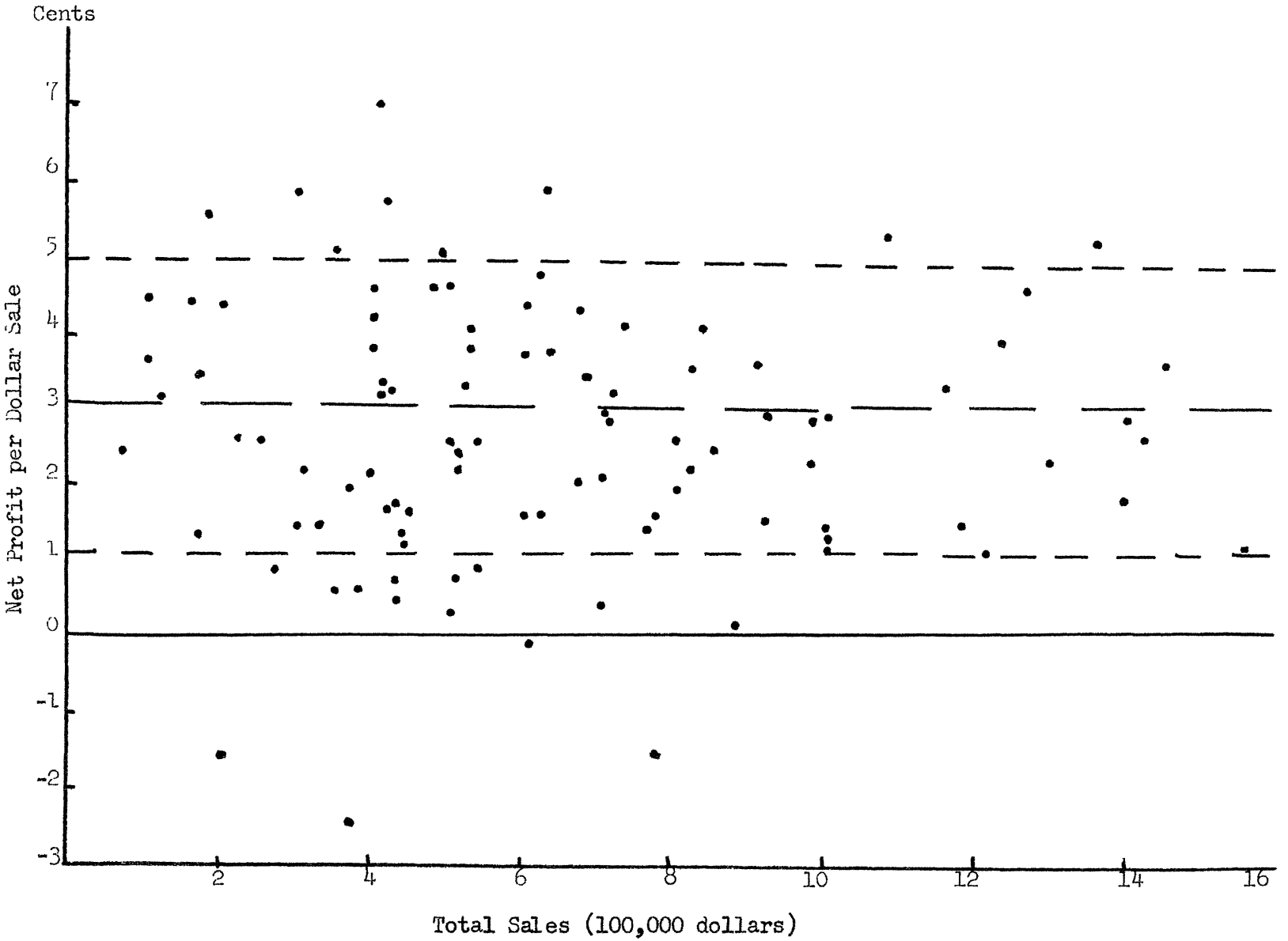
These data in Tables I, II, III and IV do not necessarily represent an ideal, but do furnish average figures to compare organizations with like sales and sales make-up, thus its use is meant to be limited.

SALES

Extreme variation of total sales volume existed among the 100 elevators. Sales ranged from $73,000 to $1,722,000. It was found that total sales volume had little influence on net profit per dollar sale. Figure 1 shows the relationship between total sales volume and net profit per dollar sale. The trend line shows that increased sales volume will result in slightly less net profit per dollar sale. Analysis of the 25 most successful and 25 least successful organizations also indicated that total sales had almost no association with net profit per dollar sale.

In the short run, an increase in total sales will improve net profit if expenses

FIGURE 1
TOTAL SALES AND NET PROFIT PER DOLLAR SALE
100 COUNTRY ELEVATORS, OHIO, 1956



do not increase proportionately with the increase in sales. If the increased volume continues, expenses may eventually increase.

Grain sales represent 60.8 per cent of the total volume of these elevators. The effect of the relative volume of grain sales on net profit per dollar sale was determined by correlation analysis. This test indicates that the proportion of grain or supply sales has only a small amount of relationship with net profit per dollar sale. Table V presents the net profit of these country elevators by groups of type of business.

Table V
Net Profit per Dollar Sale and Total Sales, by Type of Business, 100 Country Elevators, Ohio, 1956

Grain Sales as a Percent of Total Sales	Number of Elevators	Average Sales	Net Profit Per Dollar Sale
Under 10%	4	574,984	.031
10.00 - 19.99%	1	73,368	.025
20.00 - 29.99%	7	515,475	.022
30.00 - 39.99%	9	593,203	.041
40.00 - 49.99%	6	316,327	.031
50.00 - 59.99%	14	717,077	.023
60.00 - 69.99%	16	543,003	.027
70.00 - 79.99%	23	730,094	.028
80.00 - 89.99%	16	682,409	.022
90.00 -100.00%	4	1,004,965	.021

Further analysis of sales volume was directed toward determining the effect of the volume of individual commodities on net profit per dollar sales.

Dollar volume of corn sales exceeds the sale of any other item and consists of 27.8 per cent of the total sales in this sample.

Table V
Corn Sales as a Percent of Total Sales by Size of Business,
79 Country Elevators, Ohio, 1956

Total Sales	Number of Elevators	Corn Sales as a Percent of Total Sales
Under $175,000	6	19.37
175,000-349,999	9	35.64
350,000-524,999	17	24.17
525,000-699,999	13	31.30
700,000-874,999	12	26.96
875,000-1,049,999	9	28.03
1050,000-1,224,999	5	26.22
1225,000-1,399,999	3	29.59
1400,000-1,574,999	4	37.94
over 1,575,000	1	24.27

It was found that the volume of corn had almost no effect on variation in net profit per dollar sale. Corn sales relative to total sales explained less than one per cent of the variation in net profit per dollar sale.

Feed sales represent 13.8 per cent of the total volume of the 76 elevators reporting a commodity breakdown. This was the largest item in the supply category. Figure 2 shows the relationship between feed sales as a per cent of total sales and net profit per dollar sale. It was found that feed volume exerts practically no influence on net profit per dollar sale.

Similar measures were computed to determine the effect of the volume of other sales on net profit per dollar sale. Generally, sales other than grain and feed represented only a small portion of the total volume.

FIGURE 2
FEED SALES AS PERCENT OF TOTAL SALES AND NET PROFIT PER DOLLAR SALE
77 COUNTRY ELEVATORS, OHIO, 1956

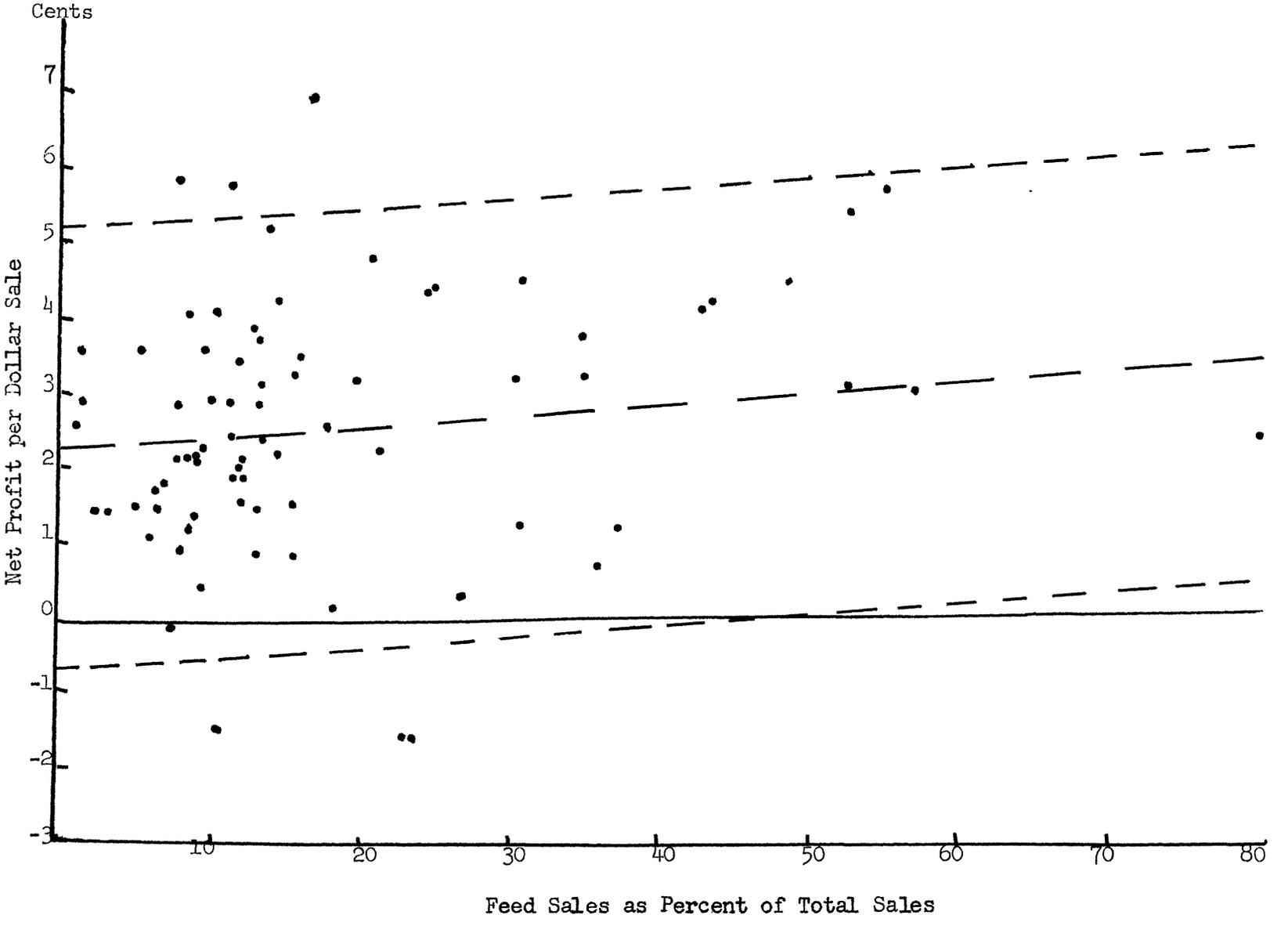


Table VI
Sales of Selected Commodities as a Percent of Total Sales,
Country Elevators, Ohio, 1956

Commodity	Number of Elevators	Percent Sales*
Fertilizer	75	5.69
Coal	77	3.20
Seed	80	2.15
Petroleum	19	13.11
Hardware, Fence, Lumber, and Miscellaneous	83	7.63

*Percentages are based on the total sales of those elevators reporting sales of these commodities.

It was found that the volume of only one of these commodities had any relationship with net profit per dollar sale. This commodity was coal. However, this item explained less than 5 per cent of the variation in net profit per dollar of sales.

Thus, we can conclude that the total sales volume or the make-up of the volume may not determine the success of our organization.

Since gross margins are the difference between purchase price and selling price, they are the major source of income for country elevators. Services are the other source of revenue. Many factors affect the per cent gross margins per dollar sale. The major influence is selling price. Competition normally determines the maximum selling price of any one commodity. Other factors such as quality of the product and the services provided also affect selling price, which in turn affects gross margins.

Wide variation existed among these 100 elevators. The range of gross margins was from 4.6 per cent to 21.3 per cent. Figure 3 shows graphically the net profit per dollar sale and gross margins per dollar sale for individual operations.

Analysis shows that gross margins do not affect net profit per dollar sale enough to be statistically significant. It does explain more of the variance of net profit per dollar sale than any other variable tested. Approximately 16 per cent of the variation of net profit per dollar sale is explained by gross margins.

A similar association was obtained when feed margins as a per cent of feed sales was correlated with net profit per dollar sale. Approximately 15 per cent of the variation in net profit per dollar sale is explained by feed margins. Feed sales account for 13.8 per cent of the total volume of the elevators reporting feed sales. Margins from feed sales compose 23.7 per cent of the total margins of those elevators reporting feed margins. Thus a change in feed margins would, to some extent, necessarily affect net profit. Yet the amount of association obtained by correlating feed margins with net profit per dollar sale is not great enough to be considered statistically significant.

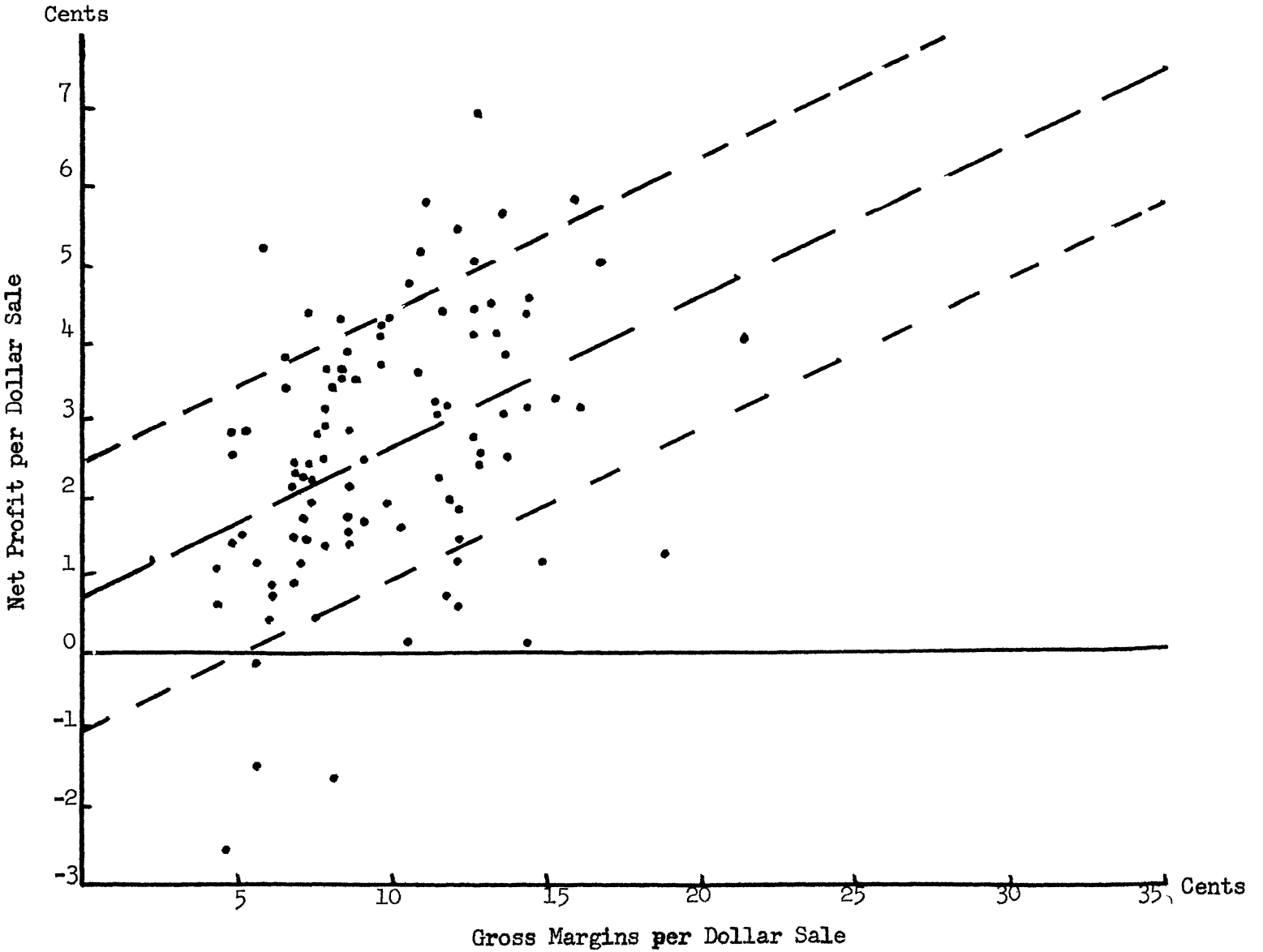
Similar measures were calculated to determine how instrumental the margins of other commodities were in achieving financial success. The following items were tested:

a) corn margins

b) fertilizer margins

c) seed margins

FIGURE 3
GROSS MARGINS PER DOLLAR SALE AND NET PROFIT PER DOLLAR SALE
100 COUNTRY ELEVATORS, OHIO, 1956



d) petroleum margins

e) miscellaneous, hardware, fence, and lumber margins

It was found that these margins explain only a small amount of the variation in net profit per dollar sale.

It may be concluded that margins do exert more influence on net profit per dollar sale than sales volume. This influence, however, is not great enough to sway the tide of success either way.

Table VII

Other Operating Income per Dollar Sale by Size of Business, 97 Country Elevators, Ohio, 1956

Total Sales	Number of Elevators	Other Operating Income per Dollar Sale
		(cents)
Under $175,000	7	4.48
175,000 - 349,999	10	2.60
350,000 - 524,999	26	3.38
525,000 - 699,999	18	2.41
700,000 - 874,999	14	1.79
875,000 - 1,049,999	9	1.35
1,050,000 - 1,224,999	5	1.66
1,225,000 - 1,399,999	3	1.47
1,400,000 - 1,575,000	4	1.75
over 1,575,000	1	0.40

OTHER OPERATING INCOME

Many management experts have indicated that services are the key to profitable operations. This hypothesis is based on the opinion that farmers tend to deal with the organizations that offer a variety of services in the most efficient manner.

It is difficult to determine from audits the extent of services offered by

country elevators. The only indication is in the dollars of income derived from these functions. Therefore the only valid comparison of services offered by elevators is to measure the total income earned therefrom.

The range of income earned from these services was .002 cents per dollar sale to 14.39 cents per dollar sale. The average was 2.12 cents per dollar sale.

It was found that other operating income per dollar sale explained only 14 per cent of the variation in net profit per dollar sale.

EXPENSES

The efficiency of a business is generally associated with a high net profit. One way to increase net profit is to reduce expenses.

Total operating expenses of the organizations in this sample ranged from 2.8 cents to 23.9 cents per dollar sale. This variance is explained largely by the relative volume of grain sales of each elevator. Total operating expenses per dollar sale declined rapidly as the volume of grain relative to total sales increased.

Table VIII

Total Operating Expenses per Dollar Sale, and Total Sales by Type of Business, 100 Country Elevators, Ohio, 1956

Grain Sales as a Percent of Total Sales	Total Sales	Number of Elevators	Operating Expense per Dollar Sale
			(cents)
Under 10%	$ 574,984	4	17.16
10.0 - 19.99	73,368	1	16.70
20.0 - 29.99	515,475	7	13.33
30.0 - 39.99	593,203	9	12.09
40.0 - 49.99	316,327	6	13.49
50.0 - 59.99	717,077	14	10.56
60.0 - 69.99	543,003	16	8.62
70.0 - 79.99	730,094	23	6.93
80.0 - 89.99	682,409	16	7.49
90.0 -100.00	1,004,965	4	3.81

It was found that only one per cent of the variance in net profit per dollar sale was explained by total operating expenses per dollar sale. The results varied little when similar measures were applied to elevators with 50 - 59.99 per cent grain

sales, and with 70 - 79.99% grain sales.

Labor Costs

Labor costs represent 55.8 per cent of the total operating expenses of this sample.

Table IX

Labor Cost per Dollar Sale by Size of Business, 100 Country Elevators, Ohio, 1956

Total Sales	Number of Elevators	Labor Cost per Dollar Sale
		(cents)
Under $175,000	7	9.36
175,000 - 349,999	11	5.44
350,000 - 524,999	27	6.56
525,000 - 699,999	18	5.46
700,000 - 874,999	15	4.57
875,000 - 1,049,999	9	4.20
1,050,000 - 1,224,999	5	4.46
1,225,000 - 1,399,999	3	4.24
1,400,000 - 1,575,000	4	4.75
over 1,575,000	1	4.81

Labor costs per dollar sale tend to decline as sales increase. This trend is evident at least until a volume of $700,000 is reached.

Analysis by correlation indicates that there is almost no association between labor cost per dollar sale and net profit per dollar sale.

A problem confronting elevator management is determining the wage levels for their employees. Competition for available labor services determines to a large extent the wage levels that an elevator must pay. The wage levels, however, vary greatly between elevators. To provide a guide to this problem, owners and managers were requested to reveal the salaries and wages paid to the various types of employees. This information is summarized in Table X.

Table X

Average Annual Salaries and Wages by Type of Employee and Size of Business for Elevators Reporting, Ohio, 1956

Total Sales	Type of Employee			
	Manager	Office	Mill & Elevator	Truck Driver
Under $175,000	$4247	$2658	$2914	$2299
175,000 - 349,999	4671	2736	3488	3172
350,000 - 524,999	5840	3140	3821	3759
525,000 - 699,999	6051	2984	3738	3726
700,000 - 874,999	5936	3354	3408	3355
875,000 - 1,049,999	6135	3595	4480	4347
1,050,000 - 1,224,999	7415	3063	4015	3898
1,225,000 - 1,399,999	7880	3974	4862	4198
1,400,000 - 1,575,000	7504	2616	4280	3580
Over 1,575,000	9395	3841	4332	4755

The wage level tends to increase as sales volume increases.

Analysis indicated that wages per man explained practically no variation in net profit per dollar sale.

Further analysis of wage scales was made with manager salaries. Theoretically, a manager is compensated in relation to his ability to promote the success of the firm. It was found that there is only a slight trend in this direction.

Although no significant relationship exists between net profit per dollar sale and wages per man and manager's salary, the conclusion cannot be drawn that a low wage policy is sound. It is considered good business to have employee stability from the standpoint of customer relationship and training costs. Frequent change in management are particularly wasteful because of the time required for a new manager to become acquainted with the customer and elevator operators.

Fixed Costs

Fixed costs are those which cannot be altered with a change in business. Examples of these costs are depreciation, taxes, rent, manager's salary and, to a certain extent, other costs. A firm with low fixed costs relative to total sales should be more flexible to changing business conditions and should be able to attain a high net profit. This hypothesis apparently does not hold true in the elevator industry. There is

almost no relationship between net profit per dollar sale and fixed costs per dollar sale in this sample.

We may conclude, therefore, that the amount of expenses or the make-up of those expenses have little or no influence on net profit per dollar sale. This is not to say a firm can become lax in controlling expenses and still remain successful. Obviously, if expenses increase without returning revenue, net profit per dollar sale will suffer.

Inventory Turnover

Inventory turnover of this sample ranged from 3.24 times to 59.47 times per year. The average inventory was determined by using the inventory that shows on the audit. This may vary as inventory and auditing practices vary. These figures exclude grain since grain generally remains in inventory only a few days. It was found that there is almost no association between net profit per dollar sale and inventory turnover.

This, of course, does not suggest that inventory turnover should be ignored. Inventory turnover is a measure of the efficiency with which capital is used. In addition, merchandise becomes shopworn when stored over long periods of time. It does suggest that inventory turnover may be over emphasized in its relation to net profit per dollar sale.

Accounts Receivable

Customer accounts receivable ranged from $339 to $105,685 in this sample. The average was $28,654.

The trade generally considers a large volume of supply sales to be associated with high accounts receivable, but this does not appear to be true in this sample.

Table XI

Accounts Receivable per Dollar Supply Sale, and Supply Sales as a Percent of Total Sales by Size of Business, 86 Country Elevators, Ohio, 1956

Total Sales	Number of Elevators	Accounts Receivable per Dollar Supply	Supply Sales as a Percent of Total Sales
Under $175,000	7	09.84	52.19
175,000 - 349,999	9	14.40	31.46
350,000 - 524,999	25	12.78	45.63
525,000 - 699,999	15	12.61	32.04
700,000 - 874,999	13	15.54	34.75
875,000 - 1,049,999	9	8.68	25.90
1,050,000 - 1,224,999	5	10.05	34.66
1,225,000 - 1,339,999	3	14.42	34.55
1,400,000 - 1,575,000	4	13.54	34.09
Over 1,575,000	1	5.07	49.61

Apparently, there is nc relation between size of business, type of business and relative size of accounts receivable. Nor does the age of accounts receivable appear to be related to the size of business.

Analysis revealed that there is little relationship between accounts receivable per dollar sale and net profit per dollar sale. This indicates that the changes in general structure in the amount of accounts receivable does not warrant the attention given by managers. Perhaps more attention should be directed toward decreasing uncollectible accounts and formulating a workable accounts receivable policy.

Table XII shows the aging of accounts receivable by the various elevator groups. Almost 9 per cent of all accounts receivable were more than one year on the books with almost 23 percent more than six months. The success any elevator will have with these older accounts will naturally effect the profit of the firm.

Table XII

Total Customer Accounts Receivable, Age of Accounts Receivable and Size of Business, 76 Country Elevators Ohio, 1956

Total Sales	Number of Elevators	Amount of Accounts Receivable				
		Under 3 months	3-6 months	6 month-1 year	over 1 year	Total
Under 175,000	4	$ 1,659	$ 527	$ 418	$ 340	$ 2,944
175,000 - 349,999	8	9,103	2,349	1,183	964	13,599
350,000 - 524,999	18	14,384	3,740	3,074	1,738	22,936
525,000 - 699,999	16	16,478	3,960	3,544	3,138	27,120
700,000 - 874,999	12	26,009	7,032	6,008	3,280	42,329
875,000 - 1,049,999	7	13,704	5,013	2,841	2,235	23,793
1,050,000 - 1,244,999	5	23,494	7,848	6,530	2,231	40,103
1,225,000 - 1,399,999	3	33,887	8,080	14,869	8,545	65,381
1,400,000 - 1,574,999	3	35,419	6,648	5,046	3,226	50,339
Average		$ 17,571	$ 4,664	$ 4,046	$ 2,528	$ 28,809

Multiple Regression

The results of the above analysis indicate that no one independent variable significantly influences net profit per dollar sale. To extend the scope of the analysis, multiple regression was used to explain the variance between net profit per dollar sale and four independent variables.

Two multiple regression problems were computed in this study. The first calculation consisted of measuring the effect of labor cost per dollar sale, grain margins, feed margins and inventory turnover (excluding grain) on net profit per dollar sale.

The results showed that on the average, net profit per dollar sale:

a) decreased 0.093049 per cent with a 1 per cent increase in labor cost per dollar sale.

b) increased o.096985 per cent with a 1 per cent increase in grain margins.

c) increased 0.520070 per cent with a 1 per cent increase in feed margins.

d) increased 0.038715 per cent with a 1 per cent increase in inventory turnover.

These four factors collectively explain 32 per cent of the variance of net profit per dollar sale.

The second computation involved measuring the effect of labor cost per dollar sale, other operating income per dollar sale, accounts receivable per dollar sale, and grain sales as a per cent of total sales on net profit per dollar sale.

On the average, net profit per dollar sale:

a) decreased 0.530962 per cent with a 1 per cent increase in labor cost per dollar sale.

b) increased 0.560313 per cent with a 1 per cent increase in other operating income.

c) decreased 0.016084 per cent with a 1 per cent increase in accounts receivable per dollar sale.

d) decreased 0.035053 per cent with a 1 per cent increase in grain sales as a per cent of total sale.

Collectively, these four factors explain 34 per cent of the variance of net profit

per dollar sale.

While individual factors do not greatly affect net profit per dollar sale, collectively they do explain a considerable amount of the variance. This indicates that there are interrelationships between the factors affecting net profit per dollar sale.

Summary and Conclusions

Simple correlation was used to measure the amount of influence that factors generally considered important by the trade have on net profit per dollar sale. Net profit per dollar of sale was used as a measure of successful operation due to its extended use and acceptance. Of those tested, none displayed an amount of association with success that could be considered statistically significant.

Use of miltiple regression extended the scope of the analysis from two to five variables. Although the results of these computations were double the highest values obtained from simple correlation, they do not explain sufficient variance to be considered statistically significant.

These results suggest that methods of evaluation used in the past in this industry are relied on to a greater extent than is warranted. Although none of these ratios can be dismissed as having no effect on net profit per dollar sale, it has become evident that no single one exercises sufficient influence to turn the tide of success one way or another.

It is possible that net profit per dollar sale is not an appropriate measure of success. Net profit per dollar sale as a goal of a firm tends to violate the principles of economics. A goal of a high net profit per dollar sale may inhibit the firm from maximizing profits. In addition, it is possible that the variables tested do affect returns, but net profit per dollar sale will not permit a valid measurement of this affect. Businessmen generally believe that the independent variables tested do have an affect on the returns on operations. However, correlation analysis indicated that each of these variables exert little or no effect.

A wide range exists in some of the data used in this study. Differences in book-

keeping procedures account for some of this range. It is possible that this factor may inhibit a valid measurement of the effect of independent variables on success.

Recommendations

Therefore, the following recommendations are made:

1. That country elevators should not use net profit per dollar sale as a measure of success.
2. That analysis be directed toward using other dependent variables such as rate of return on owner's investment and net profit expressed in dollars as a measure of successful elevator operation.
3. That further study include measuring the interrelationship between factors included in this study.
4. That the study be expanded to include intangible or psychological factors such as alertness of the manager and policies that affect customer relationships.
5. That elevator operators adopt a standardized accounting procedure.

Relationship of Selected Independent Variables to Net Profit per Dollar Sale Computed by the Least Squares Method

Independent Variable	N	Coefficient of Determination	Coefficient of Correlation
Total sales	100	.01932	-.13903
Total sales (25 most successful)	25	.00877	-.09365
Total sales (25 least successful)	25	.05429	.23299
Grain sales as a percent of total sales	100	.03435	-.18537
Corn sales as a percent of total sales	79	.00856	-.9252
Feed sales as a percent of total sales	77	.00572	.07567
Coal sales as a percent of total sales	77	.04429	.21046
Fertilizer sales as a percent of total sales	74	.00239	.04897
Seed sales as a percent of total sales	80	.07248	.00525
Petroleum sales as a percent of total sales	19	.00082	-.02870

Hardware, fence, lumber and miscellaneous sales as a percent of total sales		.00377	.05547
Gross margins per dollar sale	100	.16118	.40148
Feed margins per dollar sale	71	.15230	.39026
Corn margins per dollar sale	77	.01305	.11422
Fertilizer margins per dollar sale	70	.01742	.13198
Seed margins per dollar sale	74	.04343	.20840
Petroleum margins per dollar sale	19	.07239	-.26905
Miscellaneous, hardware, fence and lumber margins	79	.07232	.26892
Other operating income per dollar sale	96	.13718	.37039
Total operating expenses per dollar sale	100	.01060	.10294
Total operating expenses per dollar sale of elevators with 50-59.99% of sales consisting of grain	14	.02588	
Total operating expenses per dollar sale of elevators with 70-79.99% of sales consisting of grain	23	.04655	
Labor cost per dollar sale	100	.01616	.12711
Labor cost per man	88	.00208	.04555
Manager's salary	87	.02654	.16290
Fixed costs per dollar sale	97	.00015	-.01222
Inventory turnover (excluding grain)	73	.00739	-.08594
Accounts receivable per dollar sale	91	.01361	-.11664

Relationship of Selected Independent Variables to Net Profit per Dollar Sale Computed by Multiple Regression

$$XI = 6.131101 - \underset{(.080759)}{.093049}\ x\ 2 + \underset{(.071896)}{.096985}\ X\ 3 + \underset{(.108481)}{.520070}\ X\ 4 + \underset{(.023984)}{.038715}\ X\ 5$$

where X1 = net profit per dollar sale
X2 = labor cost per dollar sale
X3 = grain margins
X4 = feed margins
X5 = inventory turnover excluding grain

$$X1 = 6.652631 - \underset{(.114473)}{.530962}\ X\ 2 + \underset{(.104221)}{.560313}\ X\ 3 - \underset{(.017668)}{.016084}\ X\ 4 - \underset{(.011092)}{.035053}\ X\ 5$$

where X1 = net profit per dollar sale
X2 = labor cost per dollar sale
X3 = other operating income per dollar sale
X4 = accounts receivable per dollar sale
X5 = grain sales as a percent of total sales

NOTICE

The following corrections should be noted to avoid misinterpretation of results presented in the table on pages 23 and 24.

Page 23, line 27 should read:

Corn sales as a percent of			
total sales	79	.00856	-.09452

Page 23, line 35 should read:

Seed sales as a percent of			
total sales	80	.00525	.07248

Page 24, line 3 should read:

Hardware, fence, lumber and miscellaneous sales as a percent of total sales	83	.00377	.061384